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Illustration of the Battle of the Marston



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Mulford on Land and Sea

THE STORY OF

MULFORD SERVICE & MULFORD PRODUCTS
UNDER EVERY ALLIED FLAG



H. K. MULFORD COMPANY

Manufacturing and Biological Chemists

PHILADELPHIA, U. S. A.



THE SPIRIT OF 1917

On Land and Sea

EXHAUSTIVE statistics have been published to show the staggering quantities of ammunition, food and clothing supplied to our soldiers during the great war, but little has been written of the life-saving agents—biological and pharmaceutical products—without which the suffering and loss of life would have been much greater.

At the outset of the great World War, the United States Army had 2,047 physicians in its medical department and the Navy had 575. At its close there were over 35,000 physicians in the Army and 3,000 in the Navy, about one-quarter of the entire medical profession of this country having volunteered.

The Mulford Laboratories had the honor and privilege of supplying medical products all through the war—either directly or through the Red Cross—to combatants fighting under every Allied flag.

The Mulford organization includes six groups of biological and pharmaceutical laboratories, the main biological plant comprising 32 buildings.

During the last three years over 2,500 people have been

employed, frequently working far into the night and on Sundays in order that the needed life-saving agents might be dispatched on ocean steamers, or to the camps in our own land.

Over 1,000 horses have been in process of treatment at one time and were divided in four groups of stables, located in three different counties, so as to minimize loss of production of serums in case of fire. From three to six months are necessary to highly hyperimmunize a horse, and a conflagration that would wipe out this number of producing animals would have been nothing short of an International calamity.

Twenty-five branches, depots, and foreign distributors rendered splendid service in the distribution of our medicinal supplies to their Governments.

The Mulford staff of over 200 traveling representatives was sadly depleted by enlistments during the war, the majority being of military age. However, from Siberia to Bombay, from London and Paris to Melbourne, there was a Mulford representative in each district hastening the delivery of supplies to the fighting forces.



First Aid

Preparedness

WHEN the war cloud of 1914 burst there was no branch of the combined services in which the Allies were so little prepared as in the Medical Department. Particularly was this true as to the use and supply of biological products, and no reserve stocks were available in Europe.

Catastrophies such as the Ohio flood, the San Francisco earthquake, and the Omaha tornado, which brought disease and epidemic in their wake, had taught the H. K. Mulford Company the necessity of keeping

very large supplies of biological products in reserve, ready for emergency. The first big guns on the Marne had scarcely ceased echoing in September, 1914, when our laboratories were implored by cable to ship at once all available supplies of Tetanus Antitoxin to fight the infection then so prevalent in the fertile soil of Flanders. Our response was immediate and weekly shipments were made until the laboratories of France and England were able to supply the needs of their armies.

British Empire

ALTHOUGH a coincidence, it was singularly fortunate that the H. K. Mulford Company had established a depot in London in 1913.

Through this connection they were able to supply the British Government with emergency remedies during the period of the greatest need, not only for the use of the home forces, but also for the use of the troops

who had rallied from the dominions of the Empire beyond the seas, to fight for civilization. Tetanus Antitoxin alone was supplied in millions of doses, besides correspondingly large quantities of Antistreptococcic, Antimeningococcic and Antianthrax Serums and Typhoid, Cholera and Plague bacterins purchased by the British War Office and the Red Cross.



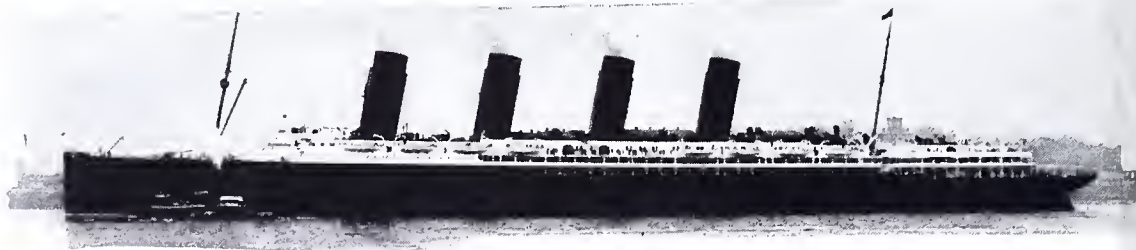
'Mid Shot and Shell



The Conservation of Life

TO the H. K. Mulford Company undoubtedly belongs the credit of originating long-distance hauling by motor truck. This was born of necessity in order to place medicinal supplies on outgoing steamers up to the hour of sailing. Unusual courtesies were extended by the steamship companies in giving preference to these shipments. On next to the last trip of the ill-fated Lusitania a cable was received from the London War Office requesting us to forward our entire supply of Antimeni-gococcic Serum to check the outbreak of cerebro-spinal meningitis which was raging in England at that time. The cable was received about 20 hours prior to the sailing of the Lusitania and all efforts to secure space seemed

unavailing. We were fortunate, however, in getting into telephone communication with one of the principals of the Cunard Line, who, appreciating the great need, told us to forward the supplies and they would be put on board the boat even if something of less importance had to be removed. Our laboratories worked until midnight to finish the shipment. The motor truck left Philadelphia about that hour and the cases were delivered on the pier in New York before the sailing of the Lusitania. The shipment was met by our representative in Liverpool, taken to London by passenger train, and delivered to the War Office about one week from the time the cable order was received in Philadelphia.



The Lusitania

Canada

WAR had scarcely been declared when Canada sprang to the aid of the Mother Country. Within a few weeks, with but little preparation, her soldiers were at the battle front in France, where their valor won the admiration of the world, and thousands now "sleep where poppies grow in Flanders fields."

Mulford biological products were part of the equipment of the first, as of subsequent expeditions.

After the establishment of the Ontario Military Hospital at Orpington, and of the Canadian Military Hospital at Cliveden, almost daily deliveries of pharmaceuticals were made to these institutions.

Bismuth-Formic-Iodide was evidently the favorite dry dressing of the Canadian forces, as thousands of cans of B. F. I. were supplied to the Medical Department through the Canadian Red Cross.



Canadian Ambulance in Flanders Fields



Anzac Red Cross

Australia and New Zealand

PROBABLY no body of men has received greater praise from the United States fighting forces than the Australian and New Zealand troops (the Anzacs), who fought so gallantly at Gallipoli, and later were brigaded with a number of our own troops in France.

Not a few of these heroic and splendid men owe their lives to the wise and timely administration of prophylactic and cura-

tive biologicals produced in the Mulford Laboratories, and supplied to the Australian and New Zealand fighting forces by the Red Cross organization in London. After the signing of the armistice, the transports returning to New Zealand carried on board adequate supplies of Mulford Antipneumococcic Serum in order to give the troops who contracted pneumonia immediate treatment.



On the Veldt

South Africa

LEAVE the Germans in German West Africa to us, we will attend to them." This was the message, in substance, that the South African Colonies sent to the Imperial Government.

The loyalty of the Transvaal was one of the most remarkable occurrences in history. Only fifteen years previously they fought a war for existence with the British and yet during the war with Germany two of the ablest of

the former Boer leaders, General Botha and General Smuts, rendered invaluable service to the British cause.

Mulford Antidysenteric Serum, Tetanus Antitoxin, Typho-Bacterin and Cholera Bacterin were supplied to the South African forces during the war, and a Mulford distributing depot in Durban is now supplying the needs of the civil population of South Africa.



The Camel Ambulance

Mesopotamia

MESOPOTAMIA, meaning the "river country," is the plain that lies between the Tigris and the Euphrates Rivers. It is first mentioned in Biblical times as the land where the servant of Abraham went forth to seek a wife for Isaac, and found Rebekah at the well in the City of Nahor.

Just as the jewels, raiment, and precious things were laden on the back of Abraham's camels in B. C. 1860, likewise Mulford Antidysenteric Serum, Emetine Hydrochloride, and other medicines to relieve the terrible conditions of the memorable campaign, were conveyed, in A. D. 1916, through the dust of centuries on the backs of

camels to protect the British troops from the scourge of dysentery and other regional diseases.

From 2500 B.C., when King Lugalzaggisi of Babylon led his victorious host to the Mediterranean, Mesopotamia had a long, complicated and exciting history and a struggle for independence that was seldom if ever maintained.

The campaign which ended so gloriously with the entrance of General Allenby and his forces into Jerusalem and the expulsion of the turks from Mesopotamia, which they had occupied since A. D. 1516, was one of the brilliant achievements of the world war.

Russia

OWING to the inefficiency of the Russian Government and the Red Cross, medical relief work in Russia during the war was carried out almost entirely by the famous all-Russian Zemstvos Union, the President of which, Prince G. E. Lvoff, was Prime Minister during the revolution.

In addition to large quantities of Tetanus Antitoxin, Typho-Bacterin and Diphtheria Antitoxin, H. K. Mulford Company

supplied many millions of medicinal tablets, including ten million Bichloride Antiseptic Tablets, to the Zemstvos Union. Each tablet was wrapped in black paper, which was the only means of informing the soldier of the poisonous nature of the ingredients.

Through the American Red Cross, several carloads of Mulford medical supplies were shipped to Russia, via Vancouver and Vladivostok.



American-Russian Hospital, Vladivostok



On the Somme

France

ON THE Somme and on the Marne, thousands of wounded French soldiers received injections of Mulford Tetanus Antitoxin which prevented infection and restored many a fighting man to the defense of his beloved Republic.

One shipment of medicinal products supplied the French Government included 17 tons (34,000 pounds) of Bismuth Subcarbonate Tablets, to restore

the impaired digestion of the troops, owing to difficulty in providing proper diet during the early days of the war. During the memorable and heroic defense of Verdun, our compressed tablet department, other than what was actually needed for domestic requirements, was devoted to the production of compressed tablets of various formulae, sedatives, digestives, antipyretics, etc., for the armies of France.



"Going up" in the Alps

Italy

WHEN Italy entered the war, in May, 1915, an urgent call was sent to the Mulford Laboratories for Tetanus Antitoxin and medical supplies of all kinds. Over one million doses of Tetanus Antitoxin and millions of doses of Quinine Sulphate, Salicylates, and other medicines, were dispatched from our labora-

tories to the Italian Government, to aid this gallant country to keep her men fit in her fight to overthrow Hohenzollernism and Hapsburgism.

The illustration shows an Italian ambulance removing the wounded up the mountain slope and conveys some idea of the difficulties encountered.



Belgian Doctors Under Fire

Belgium

THE photograph shows two Belgian Red Cross doctors who crawled out of their trench to succour a wounded soldier. They had to work lying down, for if they had dared to raise their heads they would immediately have been shot. After first aid measures were applied to the patient, they fastened a rope around his legs and pulled him back into the trench.

Not only to the brave soldiers of Belgium, but also to the civil population, did the products of the Mulford Laboratories give comfort, health and relief. Few shipments were sent by Belgian Relief Societies in the United States to Belgium during 1914 and 1915 that did not include a liberal quantity of medicinal supplies bearing the Mulford label for the conservation of life.



Serbian Red Cross

Serbia

FROM ravished Serbia, one day in 1915, came the urgent demand for many thousand doses of Typhoid and Cholera Bacterin. Typho-Bacterin was easy to produce, but, on account of possibility of contamination, Cholera-Bacterin could not be prepared in any of our existing laboratories. However, we could not withstand this call, which seemed to come as a challenge of our service to humanity, and within 24 hours after the requisition

was made, the construction of an isolated, vermin-proof and fire-proof laboratory was commenced. The building was completed and the Cholera-Bacterin delivered for shipment to Serbia within 30 days from receipt of the order—a record for service. The Serbian soldier loves his tobacco, yet it has been reported he would readily trade his tobacco allowance with a comrade for a tin of Mulford B. F. I. to relieve his blistered feet when on the march.

Saloniki

THIS photograph shows the work of the American Red Cross for the stricken people of Europe. The American Red Cross workers at this station are feeding the Saloniki refugees who are sheltered in the tents which dot the plain.

In this camp of the Allies at Saloniki, the value of the Mulford products was also in evidence. Anti-dysenteric Serum, Tetanus Antitoxin, Cholera-Bacterin and Typho-Bacterin were used under trying conditions, and undoubtedly were instrumental in lowering the mortality and preserving the health of the troops.



American Red Cross in Saloniki

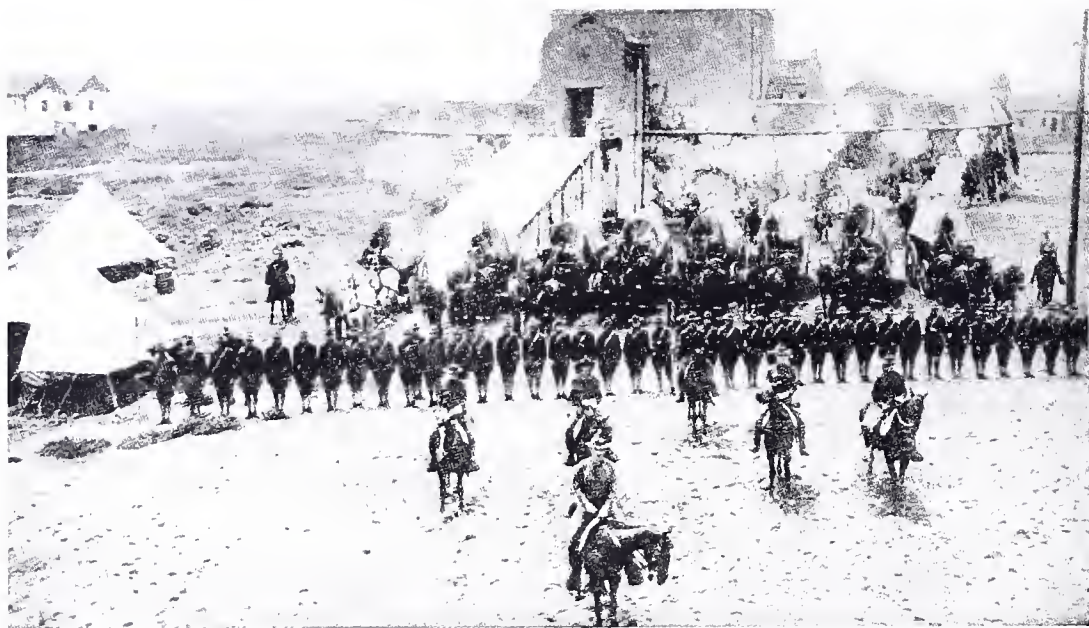


British Double Litters in Roumania

Roumania

ROUMANIA has frequently been compared to the State of Pennsylvania in area and population. Some travelers have also referred to the Blue Danube as the Delaware of Roumania, while the Transylvania Alps in a measure correspond geographically to the Alleghanies in Western Pennsylvania. When Roumania was putting up her stiffest fight, in 1916, perhaps it was only natural on account of these similar-

ities that that Nation should look to Pennsylvania, and to the Mulford Laboratories, for the much-needed supplies for her fighting men. Right into the heart of Bucharest were sent these medical supplies consisting of tablets, hypodermic injections, serums and vaccines. Had other material assistance been as prompt, the history of Roumania in the world war might have been very different.



U. S. Army Medical Corps in Mexico

The United States

ON THE Mexican border, during the mobilization of the U. S. National Guard in 1915, Mulford Antipneumococcic Serum had its first try-out on an extensive scale in the United States hospitals. Largely as a result of the statistics compiled at the hospital in El Paso, where this serum was used with much success, Antipneumococcic Serum was eventually adopted as a routine treatment of pneumonia

in the U. S. Army hospitals in this country and in France during the war. The secret of success seemed to be in the injection into the vein of large doses, 50 to 100 mils, frequently repeated.

During 1917-1918 the Mulford Laboratories kept hundreds of horses hyperimmunized with Types I, II and III pneumococci, capable of producing 20,000 doses Antipneumococcic Serum Polyvalent per week.

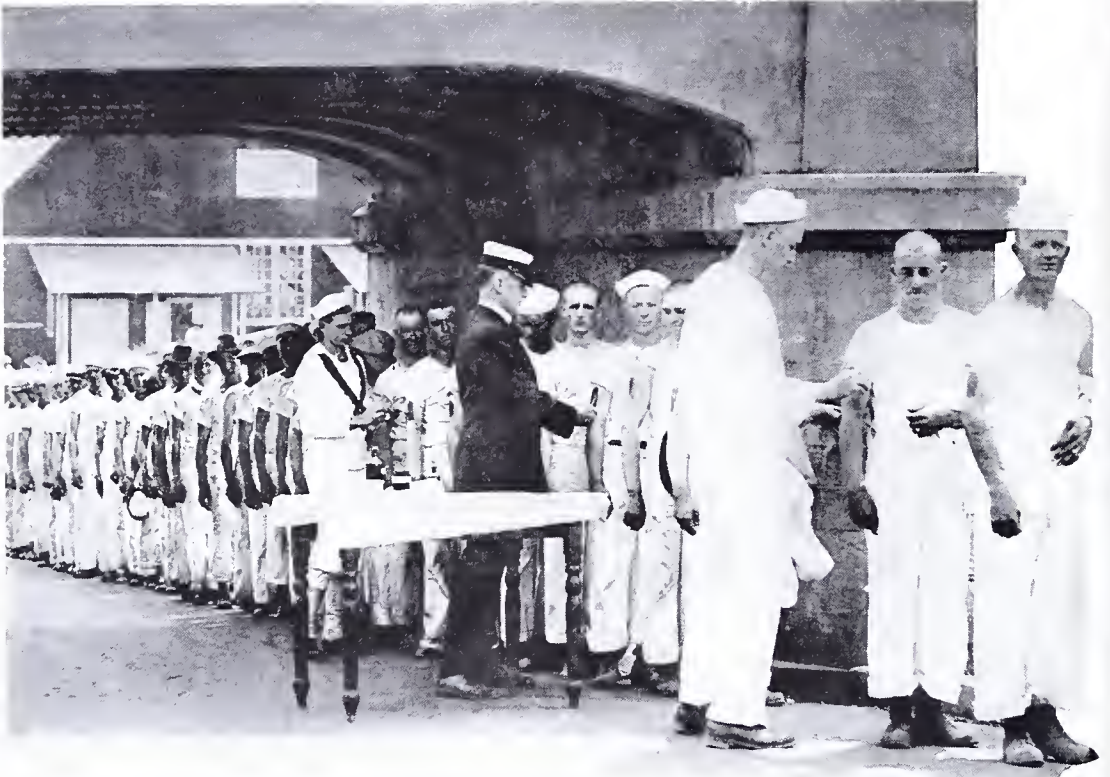


Behind the Lines

Americans in France

IN May, 1917, after the entry of the United States into the War, H. K. Mulford Company, at request of the Surgeon General of the United States Army, established a biological depot behind the lines in France to provide adequate supplies of biological products for the United States Army. This depot was continued and rendered efficient service to the first U. S. detachment, until the establishment of medical supply depots in France made it no longer necessary, and the Mulford stock was absorbed by the Surgeon

General's department. Immediately on the entry of the United States into the war the Mulford Laboratories were placed at the disposal of the Secretary of War and the Secretary of the Navy, and although this offer was not officially accepted it has frequently been stated by those in authority that it was largely owing to the foresight and energy of the H. K. Mulford Company that an adequate supply of biological products has been at all times available for the United States troops and our Allies.



Health Insurance

Americans at Home

ONE of the earliest experiences of the rookie on entering the military camp, or the gob on joining the Navy, was to be vaccinated against smallpox and typhoid fever. If any argument was needed in favor of smallpox vaccination, surely the mobilization of nearly five millions of men, drawn from all ranks and conditions of life,

without an outbreak of this loathsome disease, furnishes the necessary evidence. The H. K. Mulford Company were privileged to supply the Medical Departments of the United States Army and Navy with millions of smallpox vaccinations, and, so far as we know, not a single complaint of severe complications was received.

U. S. Naval Hospitals

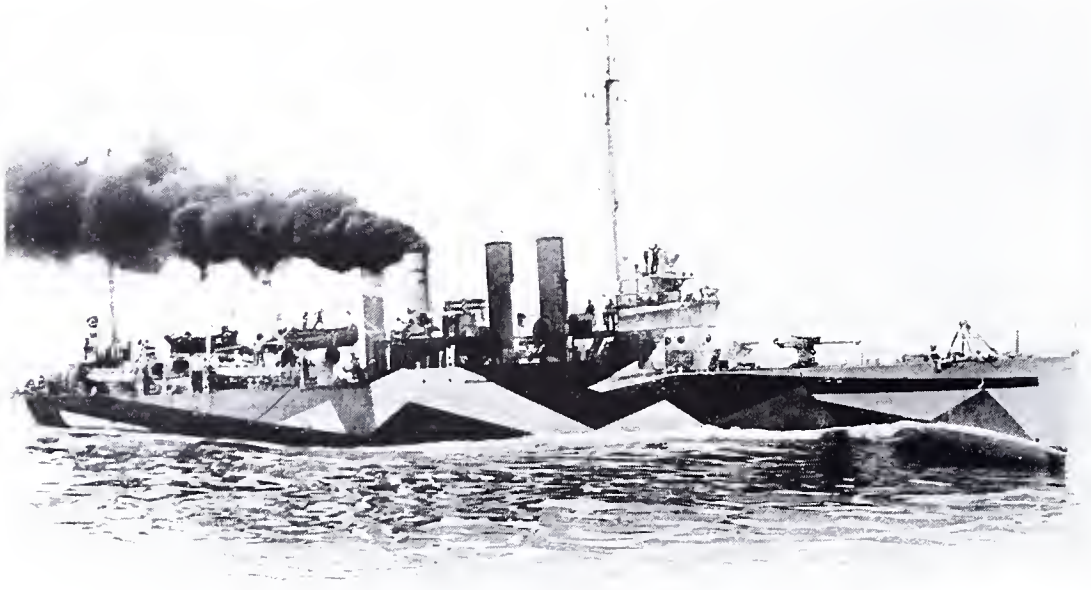
DURING the outbreak of cerebro-spinal meningitis in the United States Navy, in the Fall of 1917, the Director of the Mulford Biological Laboratories was invited by the Surgeon General of the Navy to visit the U. S. Hospital Ship Solace and co-operate with the staff of physicians in investigating the cause and treatment of the disease. The U. S. Great Lakes Naval Station and many army

cantonments were also visited by the Director, at the invitation of the Surgeon General of the Army, in order that the Mulford Laboratories might render the best possible co-operation and service to the Medical Departments.

At that time the accumulated data of our laboratories was freely placed at the disposal of the Naval and Army medical authorities.



U. S. Hospital Ship, Solace



*U. S. S. Colhoun
in War Paint*

U. S. Navy

MEDICAL supplies for the United States Navy are handled through the Bureau of Medicine and Surgery, Washington, under the Surgeon General of the Navy. No trouble or legitimate expense was spared, and nothing was left undone by the Bureau to obtain supplies for every emergency, and the protection of the men was always the first consideration.

Very few Naval vessels flying the Stars and Stripes left these shores during the period of the war without an assortment of Mulford biological and pharma-

ceutical products in their dispensary.

Particularly large quantities of Mulford Antimeningococcic and Antipneumococcic Serums were supplied during the winter of 1917-1918.

One unique service rendered to the Navy Department by the Mulford Laboratories was the manufacture of soluble washers for depth bombs. Hundreds of experiments had to be made until a suitable formula was devised that would dissolve and permit the bomb to explode in the required time.



The Secretary and Assistant Secretary of War. The former and present Surgeon Generals U. S. Army and Staff in Paris

IT IS generally admitted that no department of the United States Army was more efficiently administered, without extravagance or waste, than the Department of Medical Supplies under the direction of the Surgeon General.

Thanks to the efficiency of the United States Hygienic Laboratory, the Army Medical School and the Rockefeller Institute, the status of biological products had been determined prior to the entrance of the United States into the war.

In April, 1917, the biological and pharmaceutical manufacturers of the United States were called into consultation by the Surgeon Generals of the Army and the Navy and asked to co-

operate and speed up production. The response was unanimous and many medicinal supplies were sold below actual cost, considering administration and overhead expenses. On the whole, medical supplies were sold to the U. S. Government at lower prices comparatively than any other commodities. Notwithstanding the labor difficulties, scarcity of supplies, and the influenza epidemic, at no time during the war was the life of a United States soldier or sailor jeopardized through lack of sufficient medical supplies. Surely this is a splendid tribute to the efficiency of the staff of the Surgeon General's Office and to the manufacturers and producers who co-operated.

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